ANIMAL HUSBANDRY DIVISION
HAWAII AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF HAWAII

Progress Notes on Experiments and Other Items of Interest

No. I September, 1933

These progress notes on experimental work and other items of interest to livestock men in the Territory are issued from time to time by the Animal Husbandry Division. You are invited to suggest other lines of research that you deem important and to submit inquiries to the University.

VALUE OF KOAHAOLE (LEUCAENA GLAUCA) AS A FEED FOR DAIRY CATTLE.

The Plant

Koahaole (Leucaena glauca) is a shrub or small tree, native of tropical America but now widely distributed over the tropics. In the Territory of Hawaii it is abundant in the lowlands of both the leeward and windward sides of the islands.

This plant has long been used in a minor way as a feed for livestock but only in the last few years has there been a fuller appreciation of its value as a forage crop, and many acres have been planted to this legume in the past year, particularly on the large beef ranches.

A recent analysis by the Hawaii Experiment Station shows Koahaole to have the following composition:

	Leaves	Immature Seed Pods
Moisture	8.77%	10.97%
Protein	24.45%	20.80%
Fat	4.62%	1.55%

	Leaves	Immature Seed Pods
Nitrogen free extract	39.36%	37.04%
Fiber	14.88%	24.13%
Ash	7.92%	5.51%

Plan of Experiment

To get some definite information about the feeding value of this plant for dairy cows, one acre of an area of volunteer Koahaole growth on the University Farm was fenced off in order to confine the animals in test to a definite known area. Three purebred Holstein cows were pastured in this area at different times with and without additional feeds as follows:

Cow	Days Since Calving when Started on Koahaole Pasture	Date Started	Days on Koahaole Pasture	Rainfall During Period. Inches
49	110	June 7	60	3.10
52	50	June 7	90	3.82
62	70	Dec. 7	120	13.23

It will be noted that cows 49 and 52 were started together on June 7th in the one acre. After 60 days, cow 49 was put back on the regular herd feed again because of shortage of feed in the Koahaole acre. Cow 52 was continued another month when the feed became so limited that it was necessary to discontinue the test for the time being. Rainfall records given above show that only a limited amount of rain fell during these test periods. By Dec. 7, after 90 days of rest and 5.95 inches of rainfall, the stand of Koahaole had made an excellent recovery and cow 62 was started on test and continue until April 7.

Salt and drinking water were available at all times and cow 49 received additional concentrates. However, no feeds other than the Koahaole pasture were provided for cows 52 and 62.

The Milk Yields

(Average per day during ten day periods beginning at calving time)

Days since calving	Cow 49	Cow 52	Cow 62
	Koahaole pasture & other concentrates	Koahaole pasture only	Koahaole pasture only
1 - 10	37.1 lbs.	41.6 lb	29.5 lbs.
11 - 20	41.9	47.5	32.5
21 - 30	44.2	41.0	29.7
31 - 40	47.0	41.3	29.9
41 - 50	46.2	38.9	27.7
		(1)	
51 - 60	44.9	38.6	26.9
61 - 70	43.1	36.1	26.7
			(1)
71 - 80	42.8	33.1	21.3
81 - 90	39.0	30.4	23.8
91 - 100	37.5	30.2	23.2
101 - 110	37.4	28.2	22.3
	(1)		
111 - 120	38.7	25.4	21.0
121 - 130	40.6	24.2	21.1
131 - 140	40.6	20.9	21.8
		(2)	
141 - 150	37.9	20.7	21.3
151 - 160	36.3	22.4	18.6
161 - 170	34.4	23.2	21.4
	(2)		
171 - 180	32.2	22.5	20.8
181 - 190	28.0	23.4	19.3
			(2)
191 - 200	25.7	23.3	17.9
201 - 210	23.0	22.1	17.7
211 - 220	22.6	21.0	15.4
Average of 30 days before and 30 days after Koahaole pasture	33.3	31.2	22.0
Average on Koahaole pasture	38.1	29.7	21.3
Gain in Koahaole pasture	4.8	-1.5	-0.7

(1) Put in Koahaole pasture
(2) Removed from Koahaole pasture

The cows remained in the Koahaole acre day and night being brought to the barn only twice daily for milking.

Cows were weighed at monthly intervals. Cows 49 and 62 weighed the same at the beginning and end of their periods in Koahaole. Cow 52 lost 55 pounds.

Effect of Feeding Koahaole on Milk Flavor

Koahaole imparts a distinct undesirable flavor to the milk of cows fed solely on this legume. This was first observed by K. Kuwamoto, Herdsman at the University Farm and when samples of milk, some of which were from Koahaole fed cows, were submitted to a class of nine advanced students in Home Economics, all of them independently, reported that sample 62 (from Koahaole fed cow) had a strange, disagreeable, strong or queer flavor. They did not know the source of any of the samples. Possibly if fed right after milking the flavor might not be so marked in milk drawn twelve hours later. While this unfortunately limits the use of this valuable legume for cows in milk, it could undoubtedly be fed to advantage to young stock not yet in production or to cows during their dry period.

Gains Made by Heifers on Koahaole Pasture

Six bred heifers put in the Koahaole pasture on April 15, and given additional supplementary feeds averaged 72 pounds gain in one month.

Summary and Conclusions

1. The one cow receiving concentrates in addition to the Koahaole pasture (number 49) produced materially better when on Koahaole pasture indicating a high value for this material as a roughage.

2. Cows on Koahaole pasture only with no concentrates provided, produced only slightly less milk than when the regular feeds (green soiling crops and concentrates) were provided. This indicates that this forage crop has a high value as a feed for dairy cows, and under most conditions it should prove an efficient means of reducing milk production costs.

3. Koahaole withstands drought fairly well and while it makes little or no growth during very dry spells, it seems to recover rapidly when rains come again.

4. Koahaole unfortunately imparts an undesirable flavor to the milk of cows largely fed on this legume, which greatly limits its use for dairy cows.

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